

Timothy C. Ovaert

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EDUCATION

Ph.D., Mechanical Engineering, Northwestern University, Evanston, IL.
M.E.M., Northwestern University, Evanston, IL.
B.S., Mechanical Engineering, University of Illinois, Urbana, IL.

PROFESSIONAL EXPERIENCE

8/00 to Present University of Notre Dame, Aerospace and Mechanical Engineering Dept., Notre Dame, IN
Professor Research Interests: Orthopaedic biomaterials development, characterization, and mechanics; micro- and nanoindentation characterization and modeling of bone, cartilage, polymers, and coatings; polymer tribology; scratch characterization; analytical and numerical contact mechanics; advanced machining technologies; mechanical design.

8/89 to 8/00 The Pennsylvania State University, Mechanical Engineering Dept., University Park, PA
Assistant Professor (8/89-7/95), Associate Professor (7/95-7/00), Professor (7/00-8/00)

4/87 to 8/89 Center for Engineering Tribology, Northwestern University, Evanston, IL
Research Assistant Research in polymer and polymer composite tribology, boundary lubricated contacts, and tribology of elastomers.

11/86 to 4/87 National Inst. of Standards and Technology, Gaithersburg, MD
Mechanical Engineer Member of Tribology Group. Designed and constructed a high-temperature, low-speed oscillating sliding tribological test apparatus for advanced ceramic materials.

6/86 to 11/86 Center for Engineering Tribology, Northwestern University, Evanston, IL
Research Assistant Research in boundary lubricated contacts.

9/85 to 6/86 Mechanical Engineering Dept., Northwestern University, Evanston, IL
Teaching Assistant Classes in Mechanical Vibrations, Machine Design, Thermodynamics, Experimental Engineering, Statics, and Dynamics.

6/81 to 9/85 Wells Manufacturing, DuraBar Division, Woodstock, IL
Plant Engineer Sole resident engineer in 250k sq. ft. continuous-cast iron bar stock manufacturing facility. Responsible for all plant and manufacturing engineering functions. Designed process equipment, prepared project funding proposals for new equipment, identified cost reduction/cost effective ventures, supervised plant maintenance and new equipment/facilities installation.

PROFESSIONAL RECOGNITION AND HONORS

- 1st Source Bank Commercialization Award, SorbaSHOCK™ Floor Underlayment, 2012
- Chair, ASME International Joint Tribology Conference, San Diego, CA, October, 2007
- Elected to Fellow, ASME, 2006
- HERE Fellowship, Oak Ridge National Lab, Oak Ridge, TN, 2004
- Chair, ASME Research Committee on Tribology (2002-2004)
- Member of the ASME Tribology Division Executive Committee (2002-2007)
- Member of the ASME/STLE Tribology Conference Planning Committee (1999-2007)
- Burt L. Newkirk Award, ASME, 1998
- Outstanding Advising Award, Penn State Engineering Society, 1997
- Region III Faculty Advisor Award, ASME, 1995
- Ralph R. Teetor Educational Award, SAE, 1993
- National Young Investigator, NSF, 1992

- Research Initiation Award, NSF, 1990
- Awarded ONT-ASEE Post-Doctoral Fellowship, August, 1989 (Declined in favor of Penn State faculty position)

JOURNAL PUBLICATIONS

Bonitsky, C. M., McGann, M. E., Selep, M. J., Ovaert, T. C., Trippel, S. B., and Wagner, D. R., 2016, Genipin Crosslinking of Cartilage Damaged by Impact Enhances Resistance to Biochemical Degradation and Mechanical Wear, submitted to the *Journal of Orthopaedic Research*.

Weickenmeier, J., de Rooij, R., Budday, S., Ovaert, T. C., and Kuhl, E., 2017, The Mechanical Importance of Myelination in the Central Nervous System, accepted for publication in the *Journal of the Mechanical Behavior of Biomedical Materials*, <http://dx.doi.org/10.1016/j.jmbbm.2017.04.017>.

Weickenmeier, J., de Rooij, R., Budday, S., Steinmann, P., Ovaert, T. C., and Kuhl, E., 2016, Brain Stiffness Increases with Myelin Content, *Acta Biomaterialia*, **42**, pp. 265-272.

McGann, M. E., Bonitsky, C. M., Jackson, M. L., Ovaert, T. C., Trippel, S. B., and Wagner, D. R., 2015, Genipin Crosslinking of Cartilage Enhances Resistance to Biochemical Degradation and Mechanical Wear, *Journal of Orthopaedic Research*, **33**, 11, pp. 1571-1579.

Budday, S., Nay, R., de Rooij, R., Steinmann, P., Wyrobek, T., Ovaert, T. C., and Kuhl, E., 2015, Mechanical Properties of Gray and White Matter Brain Tissue by Indentation, *Journal of the Mechanical Behavior of Biomedical Materials*, **46**, pp. 318-330.

McGann M. E., Bonitsky C. M., Ovaert T. C., and Wagner, D. R., 2014, The Effect of Collagen Crosslinking on the Biphasic Poroviscoelastic Cartilage Properties Determined from a Semi-Automated Nanoindentation Protocol for Stress Relaxation, *Journal of the Mechanical Behavior of Biomedical Materials*, **34**, pp. 264-272.

Bayer, I. S., Labriola, M., Biris, A. S., Dervishi, E., Watanabe, F., Ghosh, A., Wang, T., Slaboch, C., Ovaert, T. C., and Biswas, A., 2013, Fabrication of Bionanocomposites Comprising Flat Nanocrystals of Calcium in Collagen Fibers Exhibiting Hardness Comparable to Metal, *RSC Advances*, **3**, pp. 20315-20323.

Blum, M. M. and Ovaert, T. C., 2013. Low Friction Hydrogel for Articular Cartilage Repair: Evaluation of Mechanical and Tribological Properties in Comparison with Natural Cartilage Tissue, *Materials Science and Engineering: C, Materials for Biological Applications*, **33**, pp. 4377-4383.

Blum, M. M. and Ovaert, T. C., 2013, Investigation of Friction and Surface Degradation of Innovative Boundary Lubricant Functionalized Hydrogel Material for use as Artificial Articular Cartilage, *Wear*, **301**, pp. 201-209.

Bagault, C., Nelias, D., Baietto, M. C., and Ovaert, T. C., 2013, Contact Analyses for Anisotropic Half-Space with an Anisotropic Coating: Effect of the Anisotropy on the Pressure Distribution and Contact Area, *International Journal of Solids and Structures*, **50**, pp. 743-754.

Blum, M. M. and Ovaert, T. C., 2012, Experimental and Numerical Tribological Studies of a Boundary Lubricant Functionalized Poro-viscoelastic PVA Hydrogel in Normal Contact and Sliding, *Journal of the Mechanical Behavior of Biomedical Materials*, **14**, pp. 248-258.

Vahdati, A., Zhao, Y., Ovaert, T. C., and Wagner, D. R., 2012, Computational Investigation of Fibrin Mechanical and Damage Properties at the Interface between Native Cartilage and Implant, *ASME Trans., Journal of Biomechanical Engineering*, **134**, p. 111004.

Blum, M. M. and Ovaert, T. C., 2012, A Novel Polyvinyl Alcohol Hydrogel Functionalized With Organic Boundary Lubricant for use as Low-Friction Cartilage Substitute: Synthesis, Physical/Chemical, Mechanical, and Friction Characterization, *Journal of Biomedical Materials Research Part B: Applied Biomaterials*, **100B**, pp. 1755-1763.

- Slaboch, C. L., Alber, M. S., Rosen, E. D., and Ovaert, T. C., 2012, Mechano-Rheological Properties of the Murine Thrombus Determined via Nanoindentation and Finite Element Modeling, *Journal of the Mechanical Behavior of Biomedical Materials*, **10**, pp. 75-86.
- Zhao, Y., Wu, Z., Turner, S., MacLeay, J., Niebur, G. L., and Ovaert, T. C., 2012, Indentation Experiments and Simulation of Ovine Bone Using a Viscoelastic-Plastic Damage Model, *Journal of Materials Research*, **27**, pp. 368-377.
- Wu, Z., Ovaert, T. C., and Niebur, G. L., 2012, Viscoelastic Properties of Human Cortical Bone Tissue Depend on Gender and Elastic Modulus, *Journal of Orthopaedic Research*, **30**, 5, pp. 693-699.
- Shepherd, T. N., Zhang, J., Ovaert, T. C., Roeder, R. K., and Niebur, G. L., 2011, Direct Comparison of Nanoindentation and Macroscopic Measurements of Bone Viscoelasticity, *Journal of the Mechanical Behavior of Biomedical Materials*, **4**, pp. 2055-2062.
- Biswas, A., Ovaert, T. C., Slaboch, C., Zhao, H., Bayer, I. A., Biris, A. S., and Wang, T., 2011, Mineral Concentration Dependent Modulation of Mechanical Properties of Bone-Inspired Bionanocomposite Scaffold, *Applied Physics Letters*, **99**, 1, p. 013702.
- Wu, Z., Baker, T. A., Ovaert, T. C., and Niebur, G. L., 2011, The Effect of Holding Time on Nanoindentation Measurements of Creep in Bone, *Journal of Biomechanics*, **44**, 6, pp. 1066-1072.
- Liu, K. and Ovaert, T. C., 2011, Poro-viscoelastic Constitutive Modeling of Unconfined Creep of Hydrogels Using Finite Element Analysis with Integrated Optimization Method, *Journal of the Mechanical Behavior of Biomedical Materials*, **4**, 3, pp. 440-450.
- Zhao, Y. and Ovaert, T. C., 2010, Error Estimation of Nanoindentation Mechanical Properties Near a Bone-Implant Interface via Finite Element Analysis and Analytical Solution Methods, *Journal of Materials Research*, **25**, 12, pp. 2308-2316.
- Lechner, L. A. and Ovaert, T. C., 2010, Value-at-risk: Techniques to Account for Leptokurtosis and Asymmetric Behavior in Returns Distributions, *Journal of Risk Finance*, **11**, 5, pp. 464-480.
- Zhang, J., Michalenko, M. M., Kuhl, E., and Ovaert, T. C., 2010, Characterization of Indentation Response and Stiffness Reduction of Bone using a Continuum Damage Model, *Journal of the Mechanical Behavior of Biomedical Materials*, **3**, 2, pp. 189-202.
- Liu, K., VanLandingham, M. R., Ovaert, T. C., 2009, Mechanical Characterization of Soft Viscoelastic Gels via Indentation and Optimization-Based Inverse Finite Element Analysis, *Journal of the Mechanical Behavior of Biomedical Materials*, **2**, 4, pp. 355-363.
- Wang, J. and Ovaert, T. C., 2009, Computational Mechanical Property Determination of Viscoelastic/Plastic Materials from Nanoindentation Creep Test Data, *Journal of Materials Research*, **24**, 3, pp. 1230-1242.
- He, L. and Ovaert, T. C., 2008, Three-Dimensional Rough Surface Contact Model for General Anisotropic Materials, *ASME Trans., Journal of Tribology*, **130**, p. 021402.
- Liu, K., Ovaert, T. C., and Mason, J. J., 2008, Preparation and Mechanical Characterization of a PNIPA Hydrogel Composite, *Journal of Materials Science: Materials in Medicine*, **19**, 4, pp. 1815-1821.
- He, L. and Ovaert, T. C., 2008, Heat Partitioning Coefficient Calculations for Sliding Contacts with Friction, *Tribology Transactions*, **51**, 1, pp. 12-18.
- Zhang, J., Niebur, G. L., and Ovaert, T. C., 2008, Mechanical Property Determination of Bone through Nano- and Micro-Indentation Testing and Finite Element Simulation, *Journal of Biomechanics*, **41**, 2, pp. 267-275.

- Lin, Y. and Ovaert, T. C., 2006, Thermal Distortion of an Anisotropic Elastic Half-Plane and its Application in Contact Problems Including Frictional Heating, *ASME Trans., Journal of Tribology*, **128**, 1, pp. 32-39.
- Lin, Y. and Ovaert, T. C., 2004, Thermoelastic Problems for the Anisotropic Elastic Half-Plane, *ASME Trans., Journal of Tribology*, **126**, 3, pp. 459-465.
- Lin, Y. and Ovaert, T. C., 2004, A Two-Dimensional Thermoelastic Rough Surface Contact Model, *ASME Trans., Journal of Tribology*, **126**, 3, pp. 430-435.
- Lin, Y. and Ovaert, T. C., 2004, Indentation of an Anisotropic Half-Space by a Heated Flat Punch, *ASME Trans., Journal of Applied Mechanics*, **71**, 2, pp. 266-272.
- Lin, Y. and Ovaert, T. C., 2004, A Rough Surface Contact Model for General Anisotropic Materials, *ASME Trans., Journal of Tribology*, **126**, 1, pp. 41-49.
- Ovaert, T. C., Kim, B. R., and Wang, J., 2003, Multi-parameter Models of the Viscoelastic/Plastic Mechanical Properties of Coatings via Combined Nanoindentation and Non-Linear Finite Element Modeling, *Progress in Organic Coatings*, **47**, 3-4, pp. 312-323.
- Lin, Y. and Ovaert, T. C., 2003, The Stress and Displacement Fields Produced in a Semi-infinite Solid by a Uniform Heat Source over a Rectangular Area on the Surface, *ASME Trans., Journal of Tribology*, **125**, 4, pp. 709-712.
- Shi, D., Lin, Y., and Ovaert, T. C., 2003, Indentation of an Orthotropic Half-Space by a Rigid Ellipsoidal Indenter, *ASME Trans., Journal of Tribology*, **125**, 2, pp. 223-231.
- Ovaert, T. C. and Pan, J., 2002, Optimal Design of Layered Structures Under Normal (Frictionless) Contact Loading, *ASME Trans., Journal of Tribology*, **124**, 3, pp. 438-442.
- Ramachandra, S. and Ovaert, T. C., 2000, Effect of Coating Geometry on Contact Stresses in Two-Dimensional Discontinuous Coatings, *ASME Trans., Journal of Tribology*, **122**, 4, pp. 665-671.
- Parmigiani, J. P. and Ovaert, T. C., 2000, The Transient Temperature Distribution in a Heavy Duty Drum Brake System During Fatigue Crack Testing, *SAE Transactions, Journal of Passenger Cars – Mechanical Systems*, **109**, 6, pp. 529-534.
- Parmigiani, J. P. and Ovaert, T. C., 1999, Crack Resistance of Cast Iron Drums in Non-Asbestos Lining Systems, *SAE Transactions, Journal of Passenger Cars*, **108**, 6, pp. 2486-2489.
- Ovaert, T. C. and Talmage, G., 1999, The Temperature of Sliding Contacts: Application to the Anisotropic Half-Space, *Tribology Transactions*, **42**, 3, pp. 654-660.
- Casalena, J. A., Badre-Alam, A., Ovaert, T. C., Cavanagh, P. R., and Streit, D. A., 1998, The Penn State Safety Floor, Part II: Reduction of Fall-Related Peak Impact Forces on the Femur, *ASME Trans., Journal of Biomechanical Engineering*, **120**, 4, pp. 526-534.
- Casalena, J. A., Ovaert, T. C., Cavanagh, P. R., and Streit, D. A., 1998, The Penn State Safety Floor, Part I: Design Parameters Associated with Walking Deflections, *ASME Trans., Journal of Biomechanical Engineering*, **120**, 4, pp. 518-526.
- Ovaert, T. C. and Badger, J. A., 1998, Sliding Friction and Heat Generation in Pressurized U-Cup Seals Under Low-Speed Reciprocating Conditions, *ASME Trans., Journal of Tribology*, **120**, 3, pp. 325-331.
- Ovaert, T. C. and Ramachandra, S., 1997, Wear Particle Formation of Polymers Against Smooth Hardened Steel Counterfaces, *Tribology Transactions*, **40**, 3, pp. 445-452.

- Ramachandra, S. and Ovaert, T. C., 1997, The Effect of Controlled Surface Topographical Features on the Unlubricated Transfer and Wear of PEEK, *Wear*, **206**, 1, pp. 94-99.
- Ovaert, T. C., 1997, Wear of Unidirectional Polymer Matrix Composites with Fiber Orientation in the Plane of Contact, *Tribology Transactions*, **40**, 2, pp. 222-234.
- Ovaert, T. C., Ramachandra, S., and McQuay, G. N., 1995, Friction Studies of Coated and Uncoated Cemented Carbide in Controlled Environment, *Journal of the Korean Society of Tribologists and Lubrication Engineers*, **11**, 5, pp. 66-70.
- Ovaert, T. C. and Ramachandra, S., 1995, The Effect of Controlled Counterface Topography on Polymer Transfer and Wear, *International Journal of Machine Tools and Manufacture*, **35**, 2, pp. 311-316.
- Ovaert, T. C., 1995, On the Wear Behavior of Longitudinally (Parallel) Oriented Unidirectional Fiber-Reinforced Polymer Composites, *Tribology Transactions*, **38**, 1, pp. 27-34.
- Haverstick, J. K. and Ovaert, T. C., 1995, Polymer/Metal Conformal Sliding Contact with Forced Convective Cooling, *ASME Trans., Journal of Tribology*, **117**, pp. 1-8.
- Wu, J. P. and Ovaert, T. C., 1994, Effect of Asperity-Scale Tensile Stresses on the Wear Behavior of Normally-Oriented Fiber Reinforced-Composites, *Tribology Transactions*, **37**, 1, pp. 23-32.
- Ovaert, T. C., 1993, On the Indentation of a Transversely Isotropic Half Space with Application to Thin Solid Lubricant Films, *ASME Trans., Journal of Tribology*, **115**, 4, pp. 650-657.
- Ovaert, T. C. and Wu, J. P., 1993, Theoretical Estimates of Asperity-Scale Stresses in Normally-Oriented Continuous Fiber Reinforced Composites, *Tribology Transactions*, **36**, 1, pp. 120-126.
- Ovaert, T. C., Shen, M. C., and Cheng, H. S., 1992, Temperature Effects on Friction and Elevated Temperature Behavior of Base Oil-Additive Combinations Under Boundary Lubricated Conditions, *SAE Trans., Journal of Fuels and Lubricants*, **100**, 4, pp. 1131-1140.
- Ovaert, T. C. and Cheng, H. S., 1991, Counterface Topographical Effects on the Wear of Polyetheretherketone and a Polyetheretherketone-Carbon Fiber Composite, *Wear*, **150**, pp. 275-287.
- Nivatvongs, K., Cheng, H. S., Ovaert, T. C., and Wilson, W. R. D., 1991, Influence of Surface Topography On Low-Speed Asperity Lubrication Breakdown And Scuffing, *Wear*, **143**, pp. 137-148.
- Ovaert, T. C. and Cheng, H. S., 1991, The Unlubricated Sliding Wear Behavior of Polyetheretherketone Against Smooth Mild-Steel Counterfaces, *ASME Trans., Journal of Tribology*, **113**, 1, pp. 150-157.
- CONFERENCE PROCEEDINGS AND PRESENTATIONS**
- Bonitsky C.M., Ovaert T.C., Trippel S.B., Wagner D.R., 2016, Photochemical Crosslinking Enhances the Wear Resistance of Articular Cartilage, *Indiana Musculoskeletal Symposium*, Indianapolis, IN.
- Bonitsky C.M., Selep M., McGann M.E., Ovaert T.C., Trippel S.B., Wagner D.R., 2016, Genipin Crosslinking of Impacted Cartilage Enhances Resistance to biochemical Degradation and Mechanical Wear. *Indiana Musculoskeletal Symposium*, Indianapolis, IN.
- Shuck, C., Ovaert, T., Mukasyan, A., 2016, Microstructure-Mechanical Property Relationship for Nanocomposite High Energy Density Materials, *MS&T 2016 Conference*, Salt Lake City, UT.
- Wagner, D.R., Bonitsky, C.M., Selep, M., McGann, M.E., Ovaert, T.C., and Trippel, S.B., 2015, Genipin Crosslinking of Impacted Cartilage Enhances Resistance to Degradation and Mechanical Wear, *Proceedings of the 62nd Annual Meeting of the Orthopaedic Research Society*, Orlando, FL.

Wagner, D.R., Bonitsky, Ovaert, T.C., and Trippel, S.B., 2015, Photochemical Crosslinking Enhances the Wear Resistance of Articular Cartilage, *Proceedings of the 62nd Annual Meeting of the Orthopaedic Research Society*, Orlando, FL.

De Rooj, R., Budday, S., Nay, R., Steinmann, P., Wyrobek, T., Ovaert, T.C., and Kuhl, E., 2015, Viscoelastic Modeling of Brain Tissue, *presented at the 9th European Solid Mechanics Conference*, Madrid, Spain.

De Rooj, R., Budday, S., Nay, R., Steinmann, P., Wyrobek, T., Ovaert, T.C., and Kuhl, E., 2015, Calibrating a Viscoelastic Model for Gray and White Matter Brain Tissue by Nanoindentation, *presented at the 2015 Engineering Mechanics Institute Conference*, Stanford, CA.

Bonitsky, C.M., Selep, M., McGann, M.E., Ovaert, T.C., Trippel, S.B., and Wagner, D.R., The Effect of Impact and Genepin Crosslinking on the Friction and Wear of Articular Cartilage, *Proceedings of the 2015 SB3C Summer Biomechanics, Bioengineering, and Biotransport Conference*, Snowbird, UT, Paper SB3C2015-24.

Ovaert, T.C., 2014, Nanoindentation and Contact Modeling of Natural and Artificial Biomaterials, *Invited Keynote Talk, MS&T 2014 Conference*, Pittsburgh, PA.

Bonitsky, C.M., McGann, M.E., Ovaert, T.C., and Wagner, D.R., 2014, Effect of Genipin Crosslinking on the Elastic and Viscoelastic Properties of Articular Cartilage via Nanoindentation, *Proceedings of the 60th Annual Meeting of the Orthopaedic Research Society*, New Orleans, LA.

Blum, M. M. and Ovaert, T. C., 2013, Investigation of Friction And Surface Degradation of Innovative Boundary Lubricant Functionalized Hydrogel Material For Use as Artificial Articular Cartilage, *Presented at the 19th International Conference on Wear of Materials*, Portland, OR, Paper O098.

Bagault, C., Nelias, D, Baietto, M.-C., and Ovaert, T. C., 2012, Contact Analyses for Anisotropic Half Space With an Anisotropic Coating, *Proceedings of the ASME/STLE 2012 International Joint Tribology Conference*, Denver, CO, Paper 61038.

Labriola, M., Slaboch, C., Ovaert, T. C., Wang, T., Csaba, G., Bayer, I., Dervishi, E., Biris, A., Ghosh, A., Gupta, R., and Biswas, A., 2012, Engineered Bone-Inspired Multicomponent Bionanocomposite Scaffolds with Tunable Hardness and Modulus, *Proceedings of the 2012 Spring MRS Meeting*, San Francisco, CA, Paper No. SS2.05.

Blum, M. M. and Ovaert, T. C., 2011, Experimental and Numerical Tribological Studies of a Boundary Lubricant Functionalized Poro-viscoelastic PVA Hydrogel in Normal Contact and Sliding, *Presented at the 4th International Conference on Mechanics of Biomaterials and Tissues*, Waikoloa, HI, Paper O100.

Slaboch, C. L. and Ovaert, T. C., 2011, Mechanical Characterization and Simulation of Murine Thrombi, *Proceedings of the 2011 ASME Summer Bioengineering Conference*, Farmington, PA, Paper No. 53190.

Zhao, Y. and Ovaert, T.C., 2011, Indentation Simulation of Ovariectomized Sheep Bone Using a Viscoelastic-Plastic Damage Model, *Proceedings of the 2011 ASME Summer Bioengineering Conference*, Farmington, PA, Paper No. 53151.

Blum, M. M. and Ovaert, T. C., 2011, Polyvinyl Alcohol Hydrogels Functionalized With Organic Boundary Lubricant for use as a Low Friction Cartilage Substitute, *Proceedings of the 2011 ASME Summer Bioengineering Conference*, Farmington, PA, Paper No. 53189.

Zhao, Y., and Ovaert, T. C., 2010, Error Estimation of Nanoindentation Mechanical Properties Near a Bone-Implant Interface via Finite Element Analysis and Analytical Solution Methods, *Proceedings of the 16th USNCTAM*, State College, PA, Paper No. 723.

Blum, M. M., and Ovaert, T. C., 2010, Synthesis and Characterization of Boundary Lubricant-Functionalized PVA Gels for Biotribological Applications, *Proceedings of the 2010 ASME Summer Bioengineering Conference*, Naples, FL, Paper No. 19281.

Michalenko, M. M., and Ovaert, T. C., 2010, Boundary Lubricant-Functionalized PVA Gels for Biotribological Applications, *Proceedings of the 2010 Spring MRS Meeting*, San Francisco, CA, Paper No. PP9.14.

Fulleriger, B., Ovaert, T. C., and Nelias, D., 2009, A Semi-Analytical Plastic-Damage Model Using the Equivalent Inclusion Problem, *Proceedings of the 2009 ASME/STLE International Joint Tribology Conference*, Memphis, TN, pp. 341-342.

Slaboch, C. L. and Ovaert, T. C., 2009, Mechano-Rheological Properties of the Murine Thrombus Determined via Nanoindentation and Finite Element Modeling, *Proceedings of the 2009 ASME Summer Bioengineering Conference*, Lake Tahoe, CA, Paper No. 206520.

Michalenko, M. M. and Ovaert, T. C., 2009, Tribological Characterization of Biomimetic Low-Friction Gels, *Proceedings of the 2009 ASME Summer Bioengineering Conference*, Lake Tahoe, CA, Paper No. 206574.

Fulleriger, B., Nelias, D., and Ovaert, T. C., 2009, A Semi-Analytical Plastic-Damage Model for Nanoindentation Contact Mechanics, *Proceedings of the 2009 ASME Summer Bioengineering Conference*, Lake Tahoe, CA, Paper No. 206813.

Liu, K., Thomas, B., Fryman, J. C., Mason, J. J., and Ovaert, T. C., 2009, Relaxation Time of a Biphasic Viscoelastic Hydrogel in Nanoindentation and Bulk Unconfined Creep Tests, *Proceedings of the 55th Annual Meeting of the Orthopaedic Research Society*, Las Vegas, NV.

Wu, Z., Baker, T., Ovaert, T. C., and Niebur, G. L., 2009, Viscoelastic Properties of Bone Depend on Gender, *Proceedings of the 55th Annual Meeting of the Orthopaedic Research Society*, Las Vegas, NV.

Zhao, Y. and Ovaert, T. C., 2009, Nanoindentation Simulation of Bovine Cortical Bone using Four- and Three-Parameter Viscoelastic/Plastic Models via Finite Element Analysis and Optimization Algorithm, *Proceedings of the 17th Annual Symposium on Computational Methods in Orthopaedic Biomechanics*, Las Vegas, NV.

Ovaert, T. C., 2008, Surface Gloss: Relating Visual Appearance to Friction and Interfacial Mechanics, Gordon Research Conference on Tribology, Waterville, ME.

Zhang, J. and Ovaert, T. C., 2008, Simulation of Nano- and Micro-Indentation Behavior of Bone via a Plastic-Damage Model, *Proceedings of the 2008 ASME Summer Bioengineering Conference*, Marco Island, FL, Paper No. 192795.

Liu, K., Ovaert, T. C., Mason, J. J., Thomas, B., Fryman, C., Bischoff, J., 2008, Optimization-Based Inverse Finite Element Analysis for Material Parameter Identification of a Biphasic Viscoelastic Hydrogel, *Proceedings of the 2008 ASME Summer Bioengineering Conference*, Marco Island, FL, Paper No. 192179.

Ovaert, T. C., Kim, B.-R., and Wang, J., 2008, The Relationship Between Top-Layer Tensile Strength and Optical Gloss Retention in Multi-Layer Coated Surfaces via Nanoindentation, Parametric Optimization, Scratch Testing, and Finite Element Modeling, presented at the 35th International Conference on Metallurgical Coatings and Thin Films, San Diego, CA, Paper No. E2-1-13.

Liu, K. and Ovaert, T. C., 2008, Biphasic Posoviscoelastic Finite Element Indentation Simulation of Hydrogels, *Proceedings of the 6th International Conference on Mechanics of Time Dependent Materials*, Monterey, CA, Paper No. 122.

Niebur, G. L., Shepherd, T. N., and Ovaert, T. C., 2008, The Viscoelastic Constants of Bone Measured by Macroscopic Testing and Nanoindentation are Correlated, *Proceedings of the 54th Annual Meeting of the Orthopaedic Research Society*, San Francisco, CA.

Arico, A. and Ovaert, T. C., 2007, A Tribological Investigation of Carbon-Carbon Composites and the Effect of Roughness and Waviness Parameters on Friction Performance, *Proceedings of the 2007 ASME/STLE International Joint Tribology Conference*, San Diego, CA, Paper No. IJTC2007-44155.

Post, M. J., Schmid, S. R., Ovaert, T. C., and Laurent, M. P., 2007, AFM Evaluation of Chemical-Mechanical Effects of Copper with Controlled Surface Chemistry, *Proceedings of the International Conference on Tribology in Manufacturing Processes*, Yokohama, Japan.

Zhang, J., Niebur, G. L., and Ovaert, T. C., 2007, Mechanical Property Determination of Bone Through Nanoindentation Testing and Finite Element Simulation, *Proceedings of the 2007 ASME Summer Bioengineering Conference*, Keystone, CO, Paper No. 176801.

Juliano, T. F., Forster, A. M., Ovaert, T. C., and VanLandingham, M. R., 2007, Probing Gel Architecture Utilizing Flat Punch Indentation, *Proceedings of the 30th Annual Adhesion Society Meeting*, Tampa, FL.

Liu, K. and Ovaert, T. C., 2006, Nanomechanical Testing and Finite Element Modeling of Polymer Gel Materials. Indiana: The State of Innovations in Orthopaedics Summit, Indianapolis, IN.

Post, M. J., Liu, J., Du, J., Schmid, S. R., Ovaert, T. C., and Laurent, M. P., 2006, Characterization of Silicon Oxide-Based Materials in an Atomic Force Microscope, *Proceedings of the ASME International Mechanical Engineering Congress and Exhibition*, Chicago, IL, Paper No. IMECE2006-15636.

He, L. and Ovaert, T. C., 2006, A Three-Dimensional Rough Surface Contact Model for the Anisotropic Half-Plane, *Proceedings of the 2006 STLE/ASME International Joint Tribology Conference*, San Antonio, TX.

Zhang, J., Niebur, G. L., and Ovaert, T. C., 2006, Viscoelastic/Plastic Finite Element Simulation of Nanoindentation Mechanical Properties of Bone, presented at the World Congress of Biomechanics, Munich, Germany.

Ovaert, T. C. and He, L., 2006, Heat Partitioning Coefficient Calculations for Sliding Contacts with Friction, presented at the STLE Annual Meeting, Calgary, Canada.

Ovaert, T. C. and Kim, B. R., 2005, Estimation of Polymer Coating Scratch Tensile Strength by Nano-indentation, Micro-scratch Testing, and Finite Element Modeling, *Proceedings of the World Tribology Congress*, Washington, DC.

Wang, J. and Ovaert, T. C., 2004, Finite Element and Gradient-Based Optimization Tools for Multi-Parameter Nanoindentation Characterization of Materials with Non-Linear Stress/Strain Behavior, *Proceedings of the ASME/STLE International Joint Tribology Conference*, Long Beach, CA.

Lin, Y. and Ovaert, T. C., 2004, Thermal Distortion of an Anisotropic Half-Plane and its Application in Contact Problems Including Frictional Heating, *Proceedings of the ASME/STLE International Joint Tribology Conference*, Long Beach, CA.

Lin, Y. and Ovaert, T. C., 2003, Thermoelastic Contact Problems for the Anisotropic Elastic Half-Space, presented at the STLE/ASME International Joint Tribology Conference, Ponte Vedra Beach, FL.

Lin, Y. and Ovaert, T. C., 2003, A Rough Surface Contact Model for General Anisotropic Materials, *Proceedings of the STLE/ASME International Joint Tribology Conference*, Ponte Vedra Beach, FL.

Ovaert, T. C. and Wang, J., 2003, Multi-Parameter Modeling of Visco-Plastic Mechanical Behavior of Polymer Thin-Films by Nanoindentation and PC-Based Finite Element Simulations, presented at the Summer ASME Mechanics and Materials Conference, Phoenix, AZ.

Vernaza-Pena, K. M., Mason, J. J., Ovaert, T. C., and Li, M., 2003, Temperature Generation in Cutting of Aluminum at Low and Negative Rake Angles, presented at the SEM Annual Conference on Experimental and Applied Mechanics, Charlotte, NC.

Ovaert, T. C., Kim, B. R., and Wang, J., 2002, Multiparameter Models of the Viscoelastic/Plastic Mechanical Properties of Coatings via Combined Nanoindentation and Non-Linear Finite Element Modeling, presented at the AFOSR Workshop on Nanoscale Approaches to Multifunctional Coatings, Keystone, CO.

Kim, B. R. and Ovaert, T. C., 2000, Determination of Material Properties of Polymeric Materials Through Nanoindentation Tests And Finite Element Modeling, presented at the Fall Meeting of the Materials Research Society, Boston, MA.

Shi, D. and Ovaert, T. C., 2000, Indentation of an Orthotropic Half-Space by a Rigid Ellipsoidal Indenter, presented at the ASME/STLE International Joint Tribology Conference, Seattle, WA.

Ovaert, T. C. and Kim, B. R., 2000, Viscoelastic-Plastic Mechanical Model of Nanoindentation of Polymer Coatings Using a Spherical Indenter and Finite Element Method, presented at the 6th Biennial North American Research Conference on the Science and Technology of Organic Coatings, Hilton Head, SC.

Ovaert, T. C., Kim, B. R., Zhao, L., 2000, Determination of Thin Polymer Layer Tensile Strength by Nano-Indentation, Micro-Scratch Testing, and Finite Element Method, presented at the Spring Materials Research Society Meeting, San Francisco, CA.

Ovaert, T. C., Kim, B. R., Zhao, L., 2000, Visco-elastic/Plastic Mechanical Model of Nano-indentation of Polymer Films Using a Spherical Indenter and Finite Element Method, presented at the Spring Materials Research Society Meeting, San Francisco, CA.

Parmigiani, J. P. and Ovaert, T. C., 2000, The Transient Temperature Distribution in a Heavy Duty Drum Brake System During Fatigue Crack Testing, *Proceedings of the SAE World Congress and Exposition*, Detroit, MI, Paper No. 2000-01-0441.

Ovaert, T. C. and Zhou, J., 2000, Environment-Controlled Machining of Al-Si Alloys with Polycrystalline and CVD Diamond Tool Inserts, presented at the International Conference on Metallurgical Coatings and Thin Films, San Diego, CA.

Ovaert, T. C. and Kim, B. R., 1999, Viscoelastic-Plastic Mechanical Model of Nanoindentation of Polymer Coatings Using Spherical Indenter and Finite Element Method, presented at the International Coatings Exposition and Federation of Societies for Coatings Technologies Annual Meeting, Dallas, TX.

McQuay, G. N. and Ovaert, T. C., 1999, Sliding Friction Tests of Coated and Uncoated WC/Co Tool Inserts in Controlled Environment, *Proceedings of the STLE/ASME Joint Tribology Conference*, Orlando, FL.

Ramachandra, S. and Ovaert, T. C., 1999, Effect of Coating Geometry on Induced Stresses in Discontinuous Coatings, presented at the STLE/ASME Joint Tribology Conference, Orlando, FL.

Parmigiani, J. P. and Ovaert, T. C., 1999, Crack Resistance of Cast Iron Drums in Non-Asbestos Lining Systems, *Proceedings of the SAE World Congress and Exposition*, Detroit, MI, Paper No. 1999-01-1337.

Ovaert, T. C. and Zhou, J., 1998, Controlled Environment Machining of Al-Si Alloy with Diamond Tools, Gordon Research Conference on Tribology, Plymouth, NH.

Ovaert, T. C. and Ramachandra, S., 1998, Discontinuous Thin-Films for Friction and Wear Applications, Gordon Research Conference on Tribology, Plymouth, NH.

Drawl, W., Badzian, A., and Ovaert, T. C., 1998, Tribological Characteristics of Nanocrystalline Diamond Films, presented at the International Conference on Metallurgical Coatings and Thin Films, San Diego, CA.

Ovaert, T. C., Conway, J. C., and McCarty, G., 1998, Erosive Wear of Metals and Castable Polyurethane by High-Velocity Polymer/Glass Pellets, presented at the STLE Annual Meeting, Detroit, MI.

- Ovaert, T. C. and Talmage, G., 1998, The Temperature of Sliding Contacts: Application to the Anisotropic Half-Space, presented at the STLE Annual Meeting, Detroit, MI.
- Ovaert, T. C., Messier, R., Pilione, L. J., Collins, R. W., Lee, J., Otaño-Rivera, W., and Zapien, J. A., 1997, Deposition and Characterization of Diamond-like Materials, invited presentation, Tribology Issues and Opportunities in MEMS, Columbus, OH.
- Ovaert, T. C. and Badger, J. A., 1997, Sliding Friction and Heat Generation in Pressurized U-Cup Seals Under Low-Speed Reciprocating Conditions, *Proceedings of the World Tribology Congress*, London, UK, Paper No. 714(1996)C/IE.
- Messier, R., Otaño-Rivera, W., Lee, J., Collins, R. W., McQuay, G. N., Ramachandra, S., and Ovaert, T. C., 1997, Preparation and Tribology of Nanocrystalline Diamond and c-BN Films, presented at the McNU'97 Conference, Chicago, IL.
- Ovaert, T. C. and Ramachandra, S., 1996, Wear Particle Formation of Polymers Against Smooth Hardened Steel Counterfaces, presented at the STLE Annual Meeting, Cincinnati, OH.
- Ovaert, T. C., Ramachandra, S., McQuay, G. N., and Pilione, L. J., 1996, Discontinuous Thin-Films for Friction and Wear Applications, *Proceedings of the International Tribology Conference*, Yokohama, Japan, **2**, pp. 1159-1164.
- Dingwell, J. B.; Ovaert, T. C., Lemmon, D. R., Cavanagh, P. R., 1996, Analytical Approaches to the Determination of Pressure Distribution Under a Plantar Prominence, *Proceedings of the 5th EMED Scientific Meeting*, University Park, PA.
- Ovaert, T. C., Ramachandra, S., and McQuay, G. N., 1995, Friction Studies of Coated and Uncoated Cemented Carbide in Controlled Environment, presented at the Korea-USA Tribology Symposium, Seoul, Korea.
- Ovaert, T. C., Ramachandra, S., and McQuay, G. N., 1995, Tribological Investigation of Coated and Uncoated Cemented Carbide under Controlled Environment Conditions, presented at the STLE Annual Meeting, Chicago, IL.
- Ovaert, T. C., 1995, Wear of Unidirectional Polymer Matrix Composites with Fiber Orientation in the Plane of Contact, presented at the STLE Annual Meeting, Chicago, IL.
- Casalena, J. A., Badre-Alam, A., Ovaert, T. C., Cavanagh, P. R., and Streit, D. A., 1994, A Dual Stiffness Floor For The Reduction of Fall Injuries: Finite Element Analysis and Design, *Proceedings of the 4th Annual Injury Prevention Through Biomechanics Symposium*, Detroit, MI, **1**, pp. 21-25.
- Badre-Alam, A., Casalena, J. A., Ovaert, T. C., Streit, D. A., and Cavanagh, P. R., 1994, A Dual Stiffness Floor For The Reduction of Fall Injuries: Testing And Implementation, *Proceedings of the 4th Annual Injury Prevention Through Biomechanics Symposium*, Detroit, MI, **1**, pp. 11-19.
- Ovaert, T. C., and Ramachandra, S., 1994, The Effect of Controlled Counterface Topography on Polymer Transfer and Wear, *Proceedings of the 6th International Conference on Metrology and Properties of Engineering Surfaces*, Birmingham, UK, Paper No. 26.
- Haverstick, J. K., and Ovaert, T. C., 1994, Polymer/Metal Conformal Sliding Contact with Forced Convective Cooling, *Proceedings of the ASME/STLE Joint Tribology Conference*, Maui, HI, Paper No. 94-Trib-1.
- Ovaert, T. C., 1994, On the Wear Behavior of Longitudinally (Parallel) Oriented Unidirectional Fiber-Reinforced Polymer Composites, *Proceedings of the STLE Annual Meeting*, Pittsburgh, PA, Paper No. 94-AM-4B-1.
- Ramachandra, S. and Ovaert, T. C., 1993, The Effect of Controlled Surface Topographical Features on the Unlubricated Transfer and Wear of PEEK, presented at the STLE/ASME Joint Tribology Conference, New Orleans, LA.

Wu, J. P., and Ovaert, T. C., 1993, Effect of Asperity-Scale Tensile Stresses on the Wear Behavior of Normally-Oriented Fiber Reinforced-Composites, *Proceedings of the STLE Annual Meeting*, Calgary, Canada, Paper No. 93-AM-2F-1.

Ovaert, T. C., and Wu, J. P., 1992, Theoretical Estimates of Asperity-Scale Stresses In Normally-Oriented Continuous Fiber Reinforced Composites, *Proceedings of the STLE Annual Meeting*, Philadelphia, PA, Paper No. 92-AM-3D-2.

Ovaert, T. C., Cheng, H. S., and Kantner, H. H., 1992, Tribological Characteristics of Elastomeric and Elastomeric/Thermoplastic Contacts Under Conformal Sliding Conditions, *Wear and Friction of Elastomers, ASTM STP 1145*, pp. 1-11.

Ovaert, T. C., Cheng, H. S., and Shen, M. C., 1991, Temperature Effects on Friction and Elevated Temperature Behavior of Base Oil-Additive Combinations Under Boundary Lubricated Conditions, *Proceedings of the SAE International Fuels and Lubricants Conference*, Detroit, MI, Paper No. 912395.

Ovaert, T. C., and Cheng, H. S., 1991, The Unlubricated Sliding Wear Behavior of Polyetheretherketone Against Smooth Mild-Steel Counterfaces, *Proceedings of the STLE/ASME Joint Tribology Conference*, Toronto, Canada, Paper No. 90-Trib-38.

Ovaert, T. C., Counterface, 1990, Topographical Effects on Polymer Wear, Gordon Research Conference on Tribology, Plymouth, NH.

BOOK CHAPTERS

Ovaert, T. C., R. Messier, L. J. Piloni, R. W. Collins, J. Lee, W. Otaño-Rivera, and J. A. Zapien, 1998, Deposition and Characterization of Diamond-like Materials, *Tribology Issues and Opportunities in MEMS*, Kluwer, London, pp. 567-578.

Ovaert, T. C., 2013, Contact of Anisotropic Materials, *Encyclopedia of Tribology*, Springer, New York, pp. 483-486.

PUBLISHED REPORTS

Bryant, M. D., Blanchet, T., Wang, Q., Ovaert, T. C., Erdemir, A., Fenske, G. R., Poeppel, R., and Ebrahim, T., ASME Research Workshop: Tribology Issues in Biology and Medicine. *ASME Trans., Journal of Tribology*, **125**, 2, pp. 217-222.

INVITED LECTURES AND SEMINARS

- *Materials Today* (Elsevier), Webinar on "Tools & Techniques for Nanomechanical Testing of Biomaterials: Part II: Softer Biomaterial Applications," July, 2010
- Rush Medical School, August, 2008
- Ohio State University, January, 2008
- University of South Carolina, June, 2007
- INA Bearing Co., May, 1996; May, 1997; April, 2002; October, 2004; December, 2007
- Norwegian University of Science and Technology, August, 2006
- Medtronic Inc., July, 2006
- Bethel College, April, 2006
- National Science Foundation, May, 2005
- General Motors Corp., April, 2005
- Hysitron Inc., November, 2004
- Oak Ridge National Laboratory, June, 2004
- DePuy Orthopedics, March, 2004
- PPG Industries Inc., June, 2003
- National Institute of Standards and Technology, October, 2002; January, 2003

- American Bearing Manufacturers Association Annual Meeting, November, 2001
- Hamilton Sunstrand Corp., May, 2000
- Kulicke & Soffa Ind., May, 2000
- University of Notre Dame, February, 2000
- DuPont Corp., December, 1999
- Xerox Corp., November, 1999
- Torrington Co., May, 1998
- Armstrong Inc., August, 1996
- Kennametal Inc., October, 1995
- Argonne National Laboratory, July, 1991
- Alcoa, June, 1991

INSTRUCTIONAL AND ADVISING ACTIVITIES

Undergraduate Courses: Design of Machine Elements, Dynamics of Mechanical Systems, Reliability Engineering, Mechanical Engineering Measurements, Heat Transfer, Mechanics of Solids. *Graduate Courses Taught:* Mechanics of Sliding Surfaces, Advanced Mechanics of Solids, Continuum Mechanics.

Undergraduate Research: 1991-1996, NSF Research Experience for Undergraduates (REU) supplement to NSF Grant (three students). 2003-present, supervised eleven undergraduate students on various research projects.

Student Groups: 1991-1995, Faculty Advisor to the ASME student chapter at Penn State. 1992-1998, Faculty Advisor to the Penn State “Sea Lion” human-powered submarine student group. Raised \$26,500 from internal and industry sources to design and build submarine, and compete in national competitions in 1995 (Carderock, MD) and 1996 (San Diego, CA).

Continuing Education: 1995-present, Lecturer on friction, wear, and lubrication topics to practicing engineers and scientists through the educational outreach (short course) activities of the American Bearing Manufacturers Association, Washington, D.C.

Graduate and (Honors) Undergraduate Theses Supervised:

Benjamin Hoggan	M.S.	8/15	Concussion Reduction Through Rotational Acceleration Attenuation.
Conor O’Donoghue	M.S.	8/13	Utilization and Commercialization of Silicon Carbide (ESTEEM Master of Science Program)
Melissa White	M.S.	8/13	Device for the Culture of Trabecular Bone Explants (ESTEEM Master of Science Program)
Michelle Blum	Ph.D.	5/12	Development, Characterization and Simulation of Low-Friction Boundary Lubricant Functionalized Hydrogels for Use as a Low Friction Cartilage Substitute
Yang Zhao	Ph.D.	5/12	Bone Indentation Modeling via Analytical and Finite Element Methods
Constance Slaboch	M.S.	5/11	Nanomechanical Characterization of the Murine Thrombus
Kaifeng Liu	Ph.D.	5/09	Mechanical Characterization and Simulation of Biphasic Viscoelastic Gels
Ling He	Ph.D.	8/07	Three Dimensional Thermoelastic Contact of Isotropic and Anisotropic Materials
Jingzhou Zhang	Ph.D.	8/07	Mechanical Property Determination of Bone Through Nano- and Microindentation Testing and Finite Element Simulation

Alan Arico	M.S.	12/06	A Tribological Investigation of Carbon-Carbon Composites and the Effect of Roughness and Waviness Parameters on Friction Performance
Juan Du	M.S.	5/06	Indentation and Scratching of CMP Coating Materials
Yuan Lin	Ph.D.	8/03	Thermoelastic Contact of Isotropic and General Anisotropic Materials
Jianjun Wang	Ph.D.	12/01	Material Property Identification of Polymer Thin-Films Under the Indentation Test
Omer Arda Vanli	M.S.	8/00	Controlled Friction Force Tests on Polymer Thin-Films
Jihui Pan	M.S.	5/00	Thickness Optimization of Elastic Structure under Indentation
Byung Ro Kim	Ph.D.	8/99	Modeling of Particle Interaction With Polymer Multi-Layered Structures
Dongai Shi	M.S.	5/99	Indentation of an Orthotropic Half-Space by a Rigid Ellipsoidal Indenter
Jin Zhou	M.S.	12/98	Environment-Controlled Machining of High Silicon Aluminum Alloy
Luhui Zhao	M.S.	12/98	Design and Construction of an Automated Scratch Tester
Sunil Ramachandra	Ph.D.	12/98	Effect of Sliding Contact Geometry on the Induced Stresses in Discontinuous Coatings
Gary McQuay	M.S.	5/97	Tribological Characterization of Coated and Uncoated WC/Co Tool Inserts Through Controlled Environment Model Friction Testing
John Parmigiani	M.S.	5/97	Crack Resistance of Heavy-Duty Brake Drums
Jeff Badger	M.S.	5/95	Friction and Wear of Sliding U-Cup Seals in Nitrogen Springs
Harry Allen	M.S.	5/95	A Testing and Calibration Device for An Inertial Navigation System
James Feese	B.S.H.	12/94	Tribological Performance of Solid Lubricating Graphites for Ball Bearing Applications
Gary McQuay	B.S.H.	12/94	A Theoretical Force/Dynamics Analysis of a Novel Non-Sacrificial Self/Solid-Lubricating Bearing Retainer Design
Askari Badre Alam	M.S.	5/94	The Design of Long-Dwell, Finite-Dwell Linkages
Sunil Ramachandra	M.S.	5/93	Deterministic Surfaces: The Effect of Engineered Topographical Features on the Transfer of Polymers
Jenq-Pyng Wu	M.S.	12/92	Wear Behavior of Normally-Oriented Unidirectional Continuous Fiber-Reinforced Composites
Jon Haverstick	M.S.	12/92	Polymer/Metal Conformal Contact With Forced Convective Cooling

EXTERNAL REVIEWS

- External reviewer for twenty-two archival journals since 1990
- FONDECYT – Chilean National Commission for Scientific and Technical Development, Proposal Reviewer, 2013
- National Science Foundation, Materials Processing and Manufacturing Program; Unsolicited Proposal Review Panel Member, January, 2010
- National Science Foundation, Nano Bio Mechanics Program; Unsolicited Proposal Review Panel Member, January, 2008
- National Science Foundation, SBIR Proposal Review Panel Member; October, 2011, February, 2010, August, 2007, August, 2006, September, 1998, June, 1996, September, 1993

- National Science Foundation, Surface Engineering and Materials Design Program, Unsolicited Proposal Review Panel Member; July, 2006, February, 2006, February, 2005, February, 2001, May, 1997, June, 1993
- National Science Foundation, Surface Engineering and Materials Design Program, CAREER Proposal Review Panel Member, September, 2004
- Centers for Disease Control and Prevention, ICRC Panel Review Member; December, 2008
- Hong Kong Research Grants Council, 2004
- U.S. Civilian Research & Development Foundation, Former Soviet Union Program, 1999-2006
- American Society for Engineering Education, Postdoctoral Fellowship Review Panel, August, 1995
- National Science Foundation, Engineering Education and Centers Division, June, 1995

JOURNAL EDITORSHIPS

Associate Editor, *ASME Trans.*, *Journal of Tribology* (1997-2003)

Editorial Board, *Biotribology* (2014-)

CONSULTING

Consultant to 30 companies from small business to Fortune 50.

PATENTS

D. A. Streit, J. Casalena, and T. C. Ovaert, *Dual Stiffness Flooring*, US Patent No. 5,542,221, August 6, 1996.

T. C. Ovaert, *Flooring Apparatus For Reducing Impact Energy During a Fall*, US Patent No. 8,109,050, February 7, 2012; US Patent No. 8,919,066 B2, December 30, 2014. Australian Patent No. 2007213470, May 16, 2013.

PROFESSIONAL MEMBERSHIP AND SERVICE

American Society of Mechanical Engineers, Tribology Division:

- 2007 STLE/ASME International Joint Tribology Conference, Conference Chair
- 2006 STLE/ASME International Joint Tribology Conference, Conference Vice-Chair
- 2005 World Tribology Congress, Organizer, Nanoindentation and Nanomechanical Property Session
- 2004 ASME/STLE International Joint Tribology Conference, Organizer, Rolling Element Bearings and Machine Components Tribology Sessions
- 2003 STLE/ASME International Joint Tribology Conference, Organizer, Manufacturing Tribology Session
- 2002 ASME/STLE International Joint Tribology Conference, Organizer, Contact Mechanics, Manufacturing Tribology, and Tribology Fundamentals Sessions
- 2001 STLE/ASME International Joint Tribology Conference, Organizer, Contact Mechanics and Manufacturing Tribology Sessions
- 2000 ASME/STLE Joint Tribology Conference, Organizer, Carbon Tribology and Manufacturing Tribology Sessions
- 1999 STLE/ASME Joint Tribology Conference, Chair, Tribology Surveillance I and II Sessions, Contact Mechanics I Session
- Editor, ASME Tribology Division Annual Newsletter, 1994-1995
- 1993 STLE/ASME Joint Tribology Conference, Vice-Chair, Wear Session
- Member of Executive Committee, Central Pennsylvania Section, 1991-1995

American Society of Mechanical Engineers, Bioengineering Division:

- Abstract Reviewer, 2008-2013 Summer Bioengineering Conference

Society of Tribologists and Lubrication Engineers:

- Session Chair and Vice Chair, Ceramics and Composites, Wear, 1998 STLE Annual Meeting, Detroit, MI
- Session Chair, Wear, 1996 STLE Annual Meeting, Cincinnati, OH
- Vice Chair, Solid Lubricants Session, 1995 STLE Annual Meeting, Chicago, IL
- Paper Solicitation Chair, Solid Lubricants Sessions; Co-Chair, Wear (Additives) Session, 1994 STLE Annual Meeting, Pittsburgh, PA
- Paper Solicitation Vice-Chair, Solid Lubricants Session, 1993 STLE Annual Meeting, Calgary, Canada
- Session Chair, Solid Lubricants, 1992 STLE Annual Meeting, Philadelphia, PA

Other Professional Society Activities:

Session Chair, Composites, Multiphase Materials and Numerical Analysis Session, 2008 Mechanics of Time Dependent Materials Conference, Monterrey, CA.

FUNDED RESEARCH

(9/01/14 - 8/31/16)

Cancer Bisphosphonate Therapy and the Pathobiology of Osteonecrosis of the Jaw: An In Vivo Multidisciplinary Approach to the First Long-Term Animal Model

Walther Cancer Foundation

\$200,000 - Co-Investigator

(9/30/09 to 10/29/13)

Biomaterials and Fixation Methods Development for Traumatic Orthopaedic Injuries

U.S. Army Medical Research and Materiel Command

\$1,357,000 – Principal Investigator

(4/01/09 to 9/30/11)

Multifunctional Nano-Ceramic Composite Design Optimization and Blast-Worthiness Design Using Cellular Automata for Improved Soldier Survivability

Mississippi State University

\$1,024,142 – Co-Investigator

(5/01/08 to 8/08/09)

Hybrid Cellular Automata for Vehicle Structural Design for Improved Soldier Crash Survivability

Mississippi State University

\$1,270,953 – Co-Investigator

(8/01/07 to 8/31/11)

Orthopaedic Implant Design and Manufacturing for Traumatic Injuries

U.S. Army Medical Research and Materiel Command

\$1,681,001 – Co-Investigator

(6/01/07 to 5/31/09)

Nanoindentation Study H4Z-MC-GJAD

Eli Lilly Co.

\$53,100 – Principal Investigator

(6/15/06 to 6/14/09)

Mechanical Modeling and Wear of Orthopedic Hydrogels

Zimmer Holdings Inc.

\$82,859 – Principal Investigator

(8/1/05 to 7/31/07)

Computer Modeling and Etiological Investigation of Acute Injury Risk

Dept. of Health and Human Services, U.S. Centers for Disease Control and Prevention

\$347,200 – Principal Investigator

(2/01/05 to 7/31/05)

Investigation of Diesel Lacquers

Borg Warner Inc.

\$38,303 – Co-Principal Investigator

(6/01/05 to 5/31/10)

Growth of Trabecular Bone Damage Due to Off-Axis Loads
National Institutes of Health
\$1,104,070 – Co-Investigator

(1/1/05 to 12/31/05)

Nanoscale Simulation of Chemical Mechanical Polishing
Cabot Corp.
\$72,000 – Co-Principal Investigator

(2/1/04 to 6/30/04)

Mechanical Characterization of Bone via Nanoindentation
Indiana University School of Medicine
\$3,300 – Principal Investigator

(9/1/01 to 8/31/07)

Tribological Investigation of the Carbon-Carbon Composite Brake System
Honeywell International
\$150,000 – Co-Investigator

(11/1/01 to 6/1/02)

Advanced Modeling of Mechanical Systems
ABB Power T&D Co.
\$15,000 – Principal Investigator

(9/1/00 to 8/31/01)

Cure Monitoring by Indentation Experiments and Numerical Simulations
Air Products and Chemicals, Inc.
\$80,000 – Principal Investigator

(9/1/99 to 8/31/00)

Development of Analytical Methods and Mechanical Hardware for Cure Monitoring of Organic Coatings
Air Products and Chemicals, Inc.
\$75,000 – Principal Investigator

(9/30/98 to 3/1/01)

Interactive Design and Modeling of Visco-Elastic Multi-Layered Materials
Armstrong World Industries, Inc.
\$303,236 – Principal Investigator

(1/1/99 to 12/31/99)

Cubic Boron Nitride Based PVD Coatings For Hard Coating Applications
Kennametal, Inc., Balzers Limited, AB Sandvik Coromant
\$75,000 – Co-Principal Investigator

(10/1/96 to 8/31/98)

Analysis of Particle Interaction with Visco-Elastic Multi-Layered Materials
Armstrong World Industries, Inc.
\$263,741 – Principal Investigator

(1/1/98 to 12/31/98)

Cubic Boron Nitride Based PVD Coatings For Hard Coating Applications
Kennametal, Inc., Balzers Limited, Valenite, Inc., AB Sandvik Coromant
\$100,000 – Co-Principal Investigator

(5/1/97 to 1/23/98)

Friction and Endurance of DLNC Coatings
Advanced Refractory Technologies Inc.
\$32,000 – Principal Investigator

(1/1/97 to 12/31/97)

Cubic Boron Nitride Based PVD Coatings For Hard Coating Applications
Kennametal, Inc., Valenite, Inc., Balzers, Inc., Sandvik Coromant
\$100,000 – Co-Principal Investigator

(1/1/96 to 12/31/96)

Cubic Boron Nitride Based PVD Coatings For Hard Coating Applications
Kennametal, Inc., Valenite, Inc., Balzers, Inc., Sandvik Coromant
\$100,000 – Co-Principal Investigator

(9/1/95 to 8/31/96)

Wear of Tubing Elbows in Plastic Chip Conveying
Conair Group/Ben Franklin Technology Center of Pennsylvania
\$64,033 – Co-Principal Investigator

(6/1/94 to 8/15/96)

Tribological Investigation of the Effect of Superionicity (Sublattice Melting) In the Mechanism of Solid Lubrication
Applied Research Laboratory, Penn State University, Education and Foundational Award Program
\$43,543 – Principal Investigator

(9/1/94 to 8/31/95)

Wear of Tubing Elbows in Plastic Chip Conveying
Conair Group/Ben Franklin Technology Center of Pennsylvania
\$63,234 – Co-Principal Investigator

(6/1/95 to 9/30/95)

Cubic Boron Nitride PVD Coatings For Cutting Tools
Kennametal Inc.
\$25,000 – Co-Principal Investigator

(9/1/93 to 8/31/94)

Cubic Boron Nitride and Diamond PVD Coatings
Ben Franklin Technology Center of Pennsylvania
\$75,000 – Co-Principal Investigator

(9/1/93 to 8/31/94)

Cubic Boron Nitride and Diamond PVD Coatings
Kennametal Inc.
\$25,000 – Principal Investigator

(9/1/93 to 8/31/95)

Tribology of Amorphous Carbon and Boron Nitride Thin Films
Ford Motor Co.
\$17,500 – Principal Investigator

(8/1/93 to 7/31/94)

Tribology of Amorphous Carbon and Boron Nitride Thin Films
Alcoa
\$7,500 – Principal Investigator

(8/15/93 to 8/14/95)

Sliding Friction in Pressurized Gas Cylinders
Teledyne International, Hyson Division
\$54,420 – Principal Investigator

(8/15/92 to 1/31/99)

Friction Reduction and Enhanced Adhesion of Amorphous Carbon and Boron Nitride Thin-Films, and the Development of an Elevated Temperature Solid-Lubricating Composite
National Science Foundation, National Young Investigator Award, REU Supplement
\$315,000 – Principal Investigator

(7/1/92 to 6/30/96)

Dually Stiff Floors for Injury Prevention in the Elderly
Department of Health and Human Services, U.S. Centers for Disease Control and Prevention
\$650,852 – Co-Investigator

(9/1/90 to 9/30/92)

Tribological Investigation of Separation Devices
Baxter Healthcare Corp., Fenwal Division
\$100,000 – Principal Investigator

(9/1/90 to 2/28/93)

Fatigue Wear, Material Transfer, and Surface Enhancement of Polymers and Polymeric Composites
National Science Foundation, Engineering Research Initiation Award, REU Supplement
\$69,005 – Principal Investigator

SERVICE ACTIVITIES

Department Level:

- Director of Graduate Studies (2009-)
- Graduate Studies Committee (2005-)
- Guest Speakers Organizer (2001-2002)
- Committee on Appointments and Promotions (2000-2004, 2008-2009, 2011-13)
- Awards Committee (2000-2002)
- Ad-hoc review of graduate course sequences in the AME Dept. (2000)
- Development Committee (1998-1999)
- Laboratories in the Curricula Committee (1998-1999)
- Promotion and Tenure Committee (1995-1999)
- Environment Committee (1996-1998)
- Invited Speaker, Graduate Teaching Fellows Seminar (1997-1998)
- Oral English Examination Committee (1997)
- Faculty Search Committee, Chair (1996-1997; hired two new faculty including one from underrepresented group)
- Faculty Search Committee (1995-1996)
- Equipment Advisory Committee, Chair (1990-1996)
- Mechanical Engineering Department representative for student exchange programs with the University of Leeds, UK. (1994-1998)
- Oral English Examination Committee, Chair (1993-1994)
- Ad-hoc Committee on Graduate Student Recruiting (1990)

College Level:

- Engineering College Council (2002-2003, 2014-)
- Volunteer speaker, Notre Dame College of Engineering Introduction to Engineering Program (2001)
- College of Engineering, Promotion and Tenure Workshop, Invited Speaker (1995-1996)
- Member, Task Force on New Advising System for Undergraduate Students (1992-1994)

- Faculty Marshal, Mechanical Engineering Department, College of Engineering Commencement (1992)
- Undertook the acquisition and distribution of the American Society of Mechanical Engineers Bulletin Board Software Library. This library contains hundreds of programs usable by College and University personnel and students for educational and research purposes (housed in the Engineering Library). Entailed correspondence with ASME, creating master library, creating distribution library, and creating detailed documentation for Engineering Library staff (1992)
- Mechanical Engineering Department Representative for College of Engineering Open House (1990)

University Level:

- Provost's committee to review the Dean of the College of Engineering (2011)
- Faculty Senate (1998-2000, 2005-2008)
- Invited Speaker, Indiana Health Industry Forum, Indianapolis, IN (2004)
- Graduate Council (2002-2003)
- Member, University Joint Committee on Insurance and Benefits (1999-2000)
- Member, Task Force on Joint Master's Degree Development Program in Manufacturing and Quality through the Colleges of Engineering and Business Administration (1993-1995)

(9/2017)